

Standing Up and Administering a Public Access VM System



2026 VM Workshop
www.vmworkshop.org

2026 VM Workshop
Thursday, June 11 2026, 09:45-10:45 Eastern
Richmond, VA, USA



Agenda

- 3 Disclaimers**
- 4 Part one**
- 6 Who we are
- 8 Part two**
- 9 Responding to needs
- 10 What can REXX and VM do?
- 11 VM/370 CE
- 12 Choosing a VM release
- 13 Demand for networking
- 14 Part three**
- 15 VM/SP
- 16 The hardware
- 17 Recreating SDFVM as PUBVM
- 21 VM/IS
- 23 Goal: User Engagement
- 24 Part four**
- 25 PUBNET mail bridge
- 26 CMS Discord client
- 27 Other system highlights
- 29 Accessing PUBVM
- 30 Requesting a new account
- 31 Biographies**
- 34 Thank you**

Disclaimers

Neither PUBVM nor the PUBNET project are supported or sponsored by IBM.

PUBVM is not an IBM project and receives no support from IBM Corporation

While IBMers volunteer on PUBVM and PUBNET, they do so on their own time and not during work hours

PUBVM service is provided on an as-is basis, using unsupported software. The PUBVM systems programming team provides no guarantees to Quality of Service, system stability, or data confidentiality. **In fact, the PUBVM systems programming team can see your passwords.** Please consider all use of the PUBVM system as subject to possible security exposure and data loss. Use at your own risk.

Use of the PUBVM system for commercial purposes or any revenue-generating activity is a violation of licensing terms and is strictly forbidden.

Part one

Our team of volunteer z/VM
systems programmers

Who we are

"Wave 1"

Evie Cooper

Graduate Researcher and Primary Instructor
Auburn University
wec@bam.moe



Bruce Hayden

Sr. Technical Enablement Specialist (Retired)
IBM Worldwide System Center
bjhayden@gmail.com



Paul Novak

Sr. Technical Enablement Specialist
IBM Worldwide System Center
pwnovak@us.ibm.com



Danielle (Dan) FitzGerald

Sr. Staff Engineer – IBM Z Platform Software
Hashicorp, an IBM Company
danfitz@us.ibm.com



Ray Mansell

IBM Z and z/VM SME (Retired)
IBM Research
mansell@pubvm.org



Rudi Rudolph

IT Specialist (z/OS)
Office of IT Services
New York State
rudi@pubvm.org



Who we are

"Wave 2"

Miguel Reyes

z/VM Systems Programmer

A global payment card company



Justice Heughan

Technical Enablement Specialist

IBM Worldwide System Center

Justice.Heughan@ibm.com



Part two

Responding to needs

1

How many times have we all heard "There is a skills shortage for IBM Z and LinuxONE"?

What about another pipeline for skills?

2

There is a huge community of people who are VM fans! The VM community has always been known for friendly knowledge sharing. Forums are great, but what about hand-on skills?

3

There has been no truly viable and well managed public-access VM system for hobbyists. It is baffling that this concept is so hard for some to grasp.

4

Licensing for a hobbyist system would be out of reach for virtually every scenario. What if a system already existed with an established hobbyist license though?

5

The pre OCO version of VM/370 is easily accessible to anyone wanting to use it. It's so old though, it provides very little practical experience to anyone seeking VM skills.

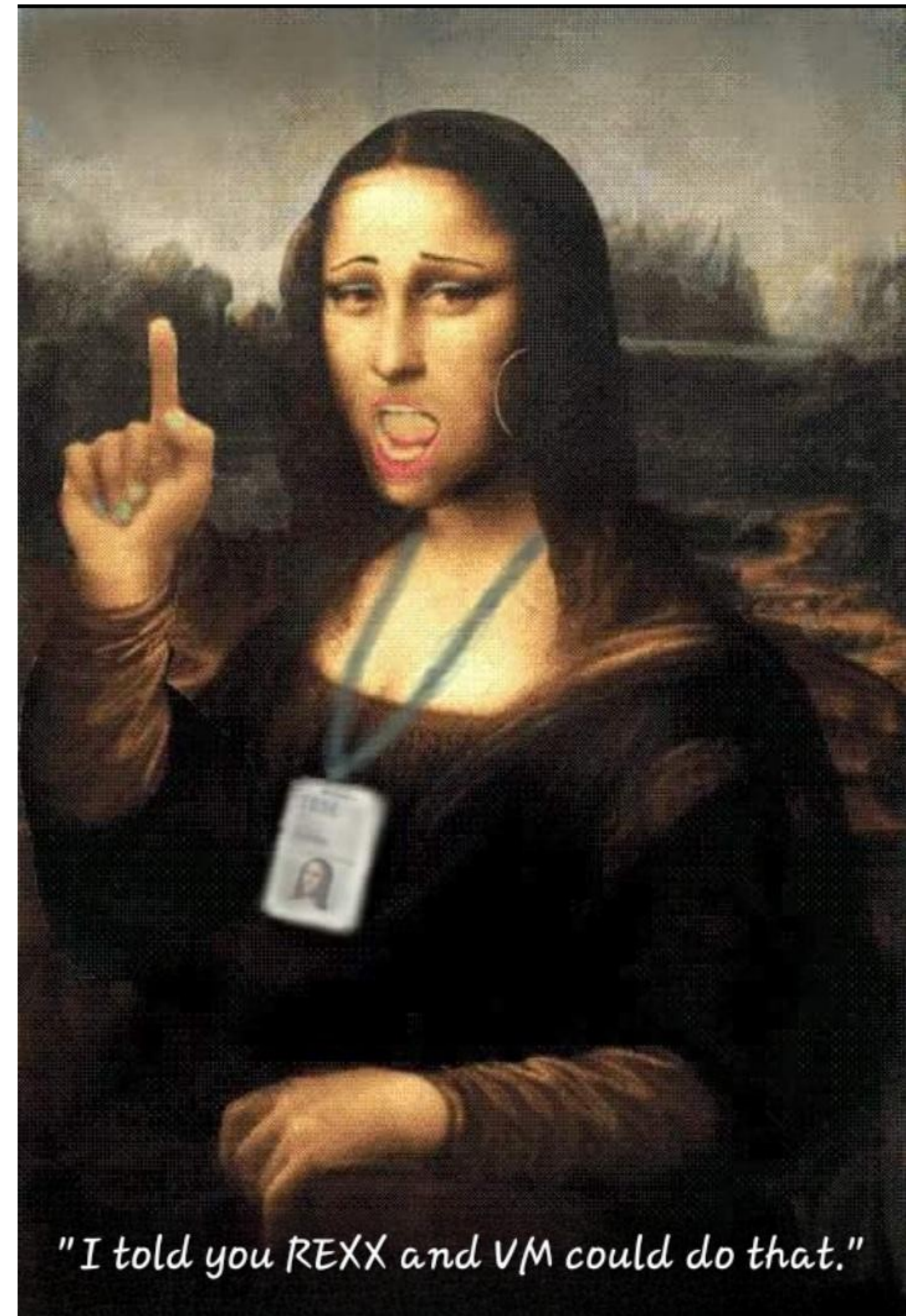
6

CUF, file & disk utilities, optional priced features and more are all skills that fall well inside of the "skills shortage". But, there is no practical way to gain those skills or interact with others willing to pass that info. .

What can
REXX and
VM do?

**Just about
everything!**

It is beyond foolish not to work on creating as many
skills pipelines as possible.



VM/370 CE

The VM hobbyist community has VM/370 Community Edition, a modified version of VM/370 release 6

This is easily accessible, but very lacking as a VM release:

- No XEDIT

- No native S/370 VS compilers

- No NJE-capable RSCS

- No PROFS, GDDM, TCP/IP, etc.

- Has native EXEC II, but no native REXX (i.e. their REXX is not DMSREX)

As a result, there was strong desire in the community for a properly-run VM/SP system

Choosing a VM release

With VM/370 CE being unsuitable as a practical example of modern VM/CMS systems, we looked at other options for a "museum quality" VM/CMS deployment

We knew that we wanted to run a release prior to VM/ESA, leaving us with four choices

VM/SP Releases 1-4: Missing key quality-of-life features (arbitrary terminal sizing, HELPCMS, etc.)

VM/SP Release 6: Somewhat buggy, often replaced by VM/ESA "370 feature"

VM/ESA Release 1.1 370 Feature: Prone to crashing, unsuitable for public exhibit

VM/XA: Notoriously unstable, CMS 5.5 (bimodal CMS) introduces other problems

VM/SP Release 5: Good middle ground. Supports arbitrary terminal sizing, AVS, HELPCMS. Downside: lacks SFS support.

Demand for networking

Without proper networking natively available for VM/370 CE, there has been strong demand from the VM hobbyist community for VM networking solutions

VNET recreation (NJE protocol) – Moshe Barr

SNA/SNI network recreation – Evie Cooper

TCP/IP:

Newest VM TCP/IP stack SP5 can run: VM TCP/IP v2r1

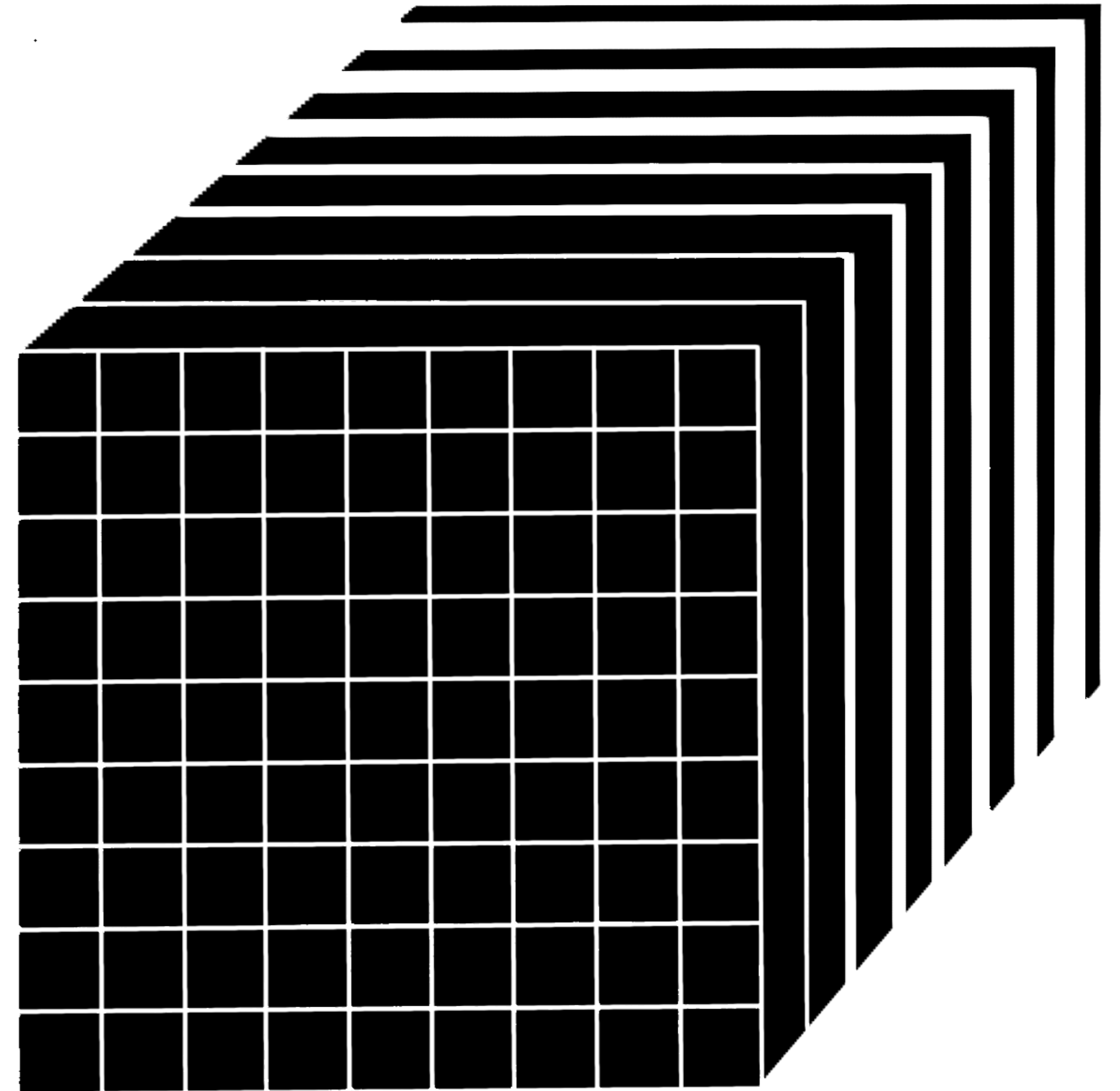
Provides SMTP, FTP, NFS, Telnet client/server, etc.

Part three

IBM Virtual Machine/System Product (VM/SP)

VM/SP, a milestone version, replaced VM/370, VM/BSE, and VM/SE

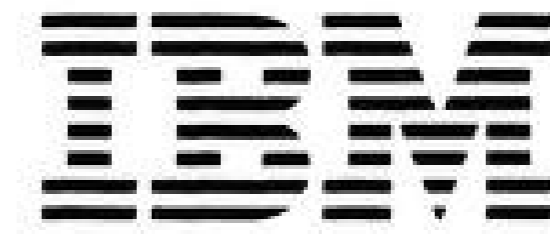
- Release 1 added [EXEC2](#) and [XEDIT](#) System Product Editor
- Release 3 added [REXX](#)
- Release 6 added the shared filesystem



The hardware

IBM 4381

Model Group 3



Maintenance Information

4381-3 S/N MI	4381-3 S/N MI	4381-3 S/N MI	4381-3 S/N MI	4381-3 S/N MI	4381-3 S/N MI	4381-3 S/N MI	4381-3 S/N MI
MAINTENANCE INFORMATION	MAINTENANCE INFORMATION	MAINTENANCE INFORMATION	MAINTENANCE INFORMATION	MAINTENANCE INFORMATION	MAINTENANCE INFORMATION	MAINTENANCE INFORMATION	MAINTENANCE INFORMATION
SAFETY INDEX TERMS/ ABBREVIATIONS INTRODUCTION START PU REPAIR CHNL REPAIR MSS REPAIR END OF REPAIR	PWR REPAIR (HWS AND MBC) PR 001 THRU PR 999	PWR REPAIR (PROCI) PR 1001 THRU PR 13 XX	PWR REPAIR (PROCI) PR 1401 THRU PR 18 XX	PWR REPAIR (PROCI) PR 1901 THRU PR 5001	SERVICE AIDS	LOCATIONS TOOLS REMOVAL/ REPLACEMENT PREVENTIVE MAINTENANCE DIAGNOSTICS LOGS SYSTEM TEST INSTALLATION SAFETY INSP	CONSOLE FUNCTIONS MESSAGES
VOL A01	VOL A02	VOL A03	VOL A04	VOL A05	VOL A06	VOL A07	VOL A08



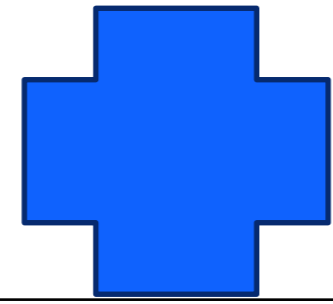
4381

**4381 Processor
Model Group 3
Console Functions
and Messages**

Recreating SDFVM as PUBVM

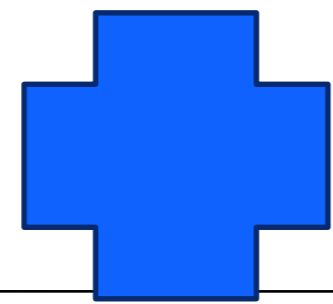
Recreating SDFVM as PUBVM

Docs



A LOT of time spent reading historical documents. We owe an incredible amount of gratitude to Jamie and L.J. in the IBM Corporate Archives for helping us find documents. We could not have done this without them!

VM/IS



Evie generated a VM/IS R5 system on a Saturday in October of 2023 as an experiment.

Rudi reached out to Evie in June 2025 to ask about using her VM/IS system to fully replace SDFVM.

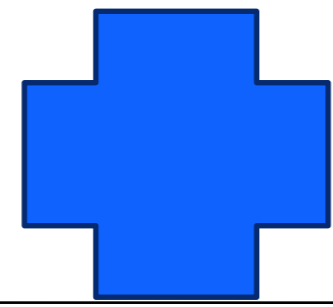
4381

Because the license is tied to the hardware, we fully shut down SDFVM.

Recreating
SDFVM as
PUBVM

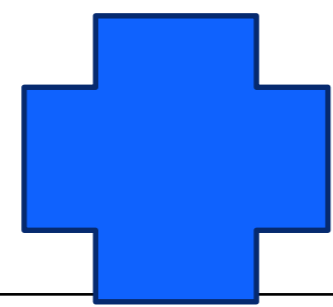
Pipes

Ray and Bruce produced a specialized version of CMS Pipelines that would be functional on VM/SP R5.



TOOLS VMLINK

The newly produced version of CMS Pipelines allowed us to adopt use of the TOOLSRUN framework, obtained from the z/VM Downloads page. We also obtained VMLINK from z/VM Downloads and reworked it to function under SP R5.



Web

PUBVM is web enabled! Served entirely on VM, too!
<http://www.pubvm.org>

But wait...
There's more!

IBM Virtual Machine/Integrated System (VM/IS)

In the end, for PUBVM we decided to deploy VM/IS 5. But what is VM/IS?

VM/IS was the first of many attempts that IBM made to create a turnkey VM deployment. The IBM 9370 Information System was sold as a "VAX-killer" to various non-computer-intensive markets (like office settings where word processing, email, and presentation graphics were in demand).

VM/IS builds upon a VM/SP 5 base, but includes the following products (and, as such, PUBVM includes):

- Networking: VTAM (SNA), TCP/IP, PVM, TSAF, etc
- Languages: VS COBOL II, PL/I Optimizer, C for VM (Whitesmiths), VS FORTRAN II, VS PASCAL, BASIC/VM
- Data Management: SQL/DS
- Office Software: PROFS, IPF/VM, GDDM, DCF/SCRIPT, BookMaster
- Support Programs: ISPF, IOS3270

VM/IS packages included premade tapes that could quickly install all of the above components.

IBM Virtual Machine/Integrated System (VM/IS)

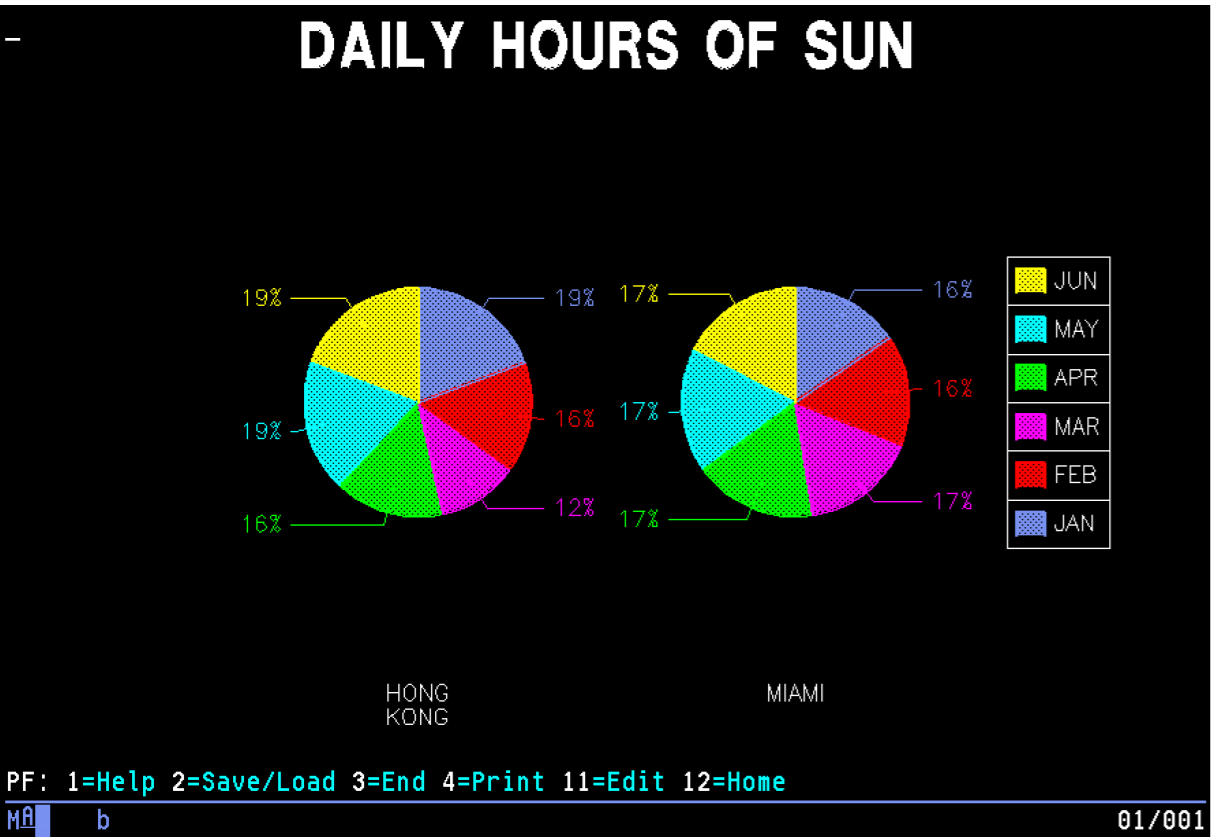
```

PROFS MAIN MENU                                A00
Press one of the following PF keys.
PF1 Process calendars
PF2 Open the mail
PF3 Find documents
PF4 Process notes and messages
PF5 Prepare documents
PF6 Process documents from other sources
PF7 Process the mail log
PF8 Check the outgoing mail
PF10 Add an automatic reminder
PF11 View main menu number 2
5664-309 (C) Copyright IBM Corp. 1983, 1987
PF9 Help PF12 End

Time: 1:15 PM
1926 JUNE 1926
S M T W T F S
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30
Day of Year: 162
====> _
Mail Waiting
M&A b 23/006
  
```

```

Document: PUBVMOL SCRIPT A1 At: ":li." 13:16
:ul.
:li.The Need
:ul.
:li.The community has :hp2.VM/370 CE:ehp2. (VM/370
Release 6)
:ul.
:li.Accessible but rather lacking
:li.No XEDIT, no native 370 VS compilers, no fancy
products like RSCS release 2, PROFS, GDDM,
TCP/IP, etc
:li.Non-native REXX (only EXEC II is native)
:li.Strong desire in the community for a
PF1 Help PF2 Opencl PF3 Quit PF4 Copy PF5 Move PF6 ?
PF7 Up PF8 Down PF9 = PF10 Select PF11 Splitj PF12 Focus
M&A b 09/015
  
```



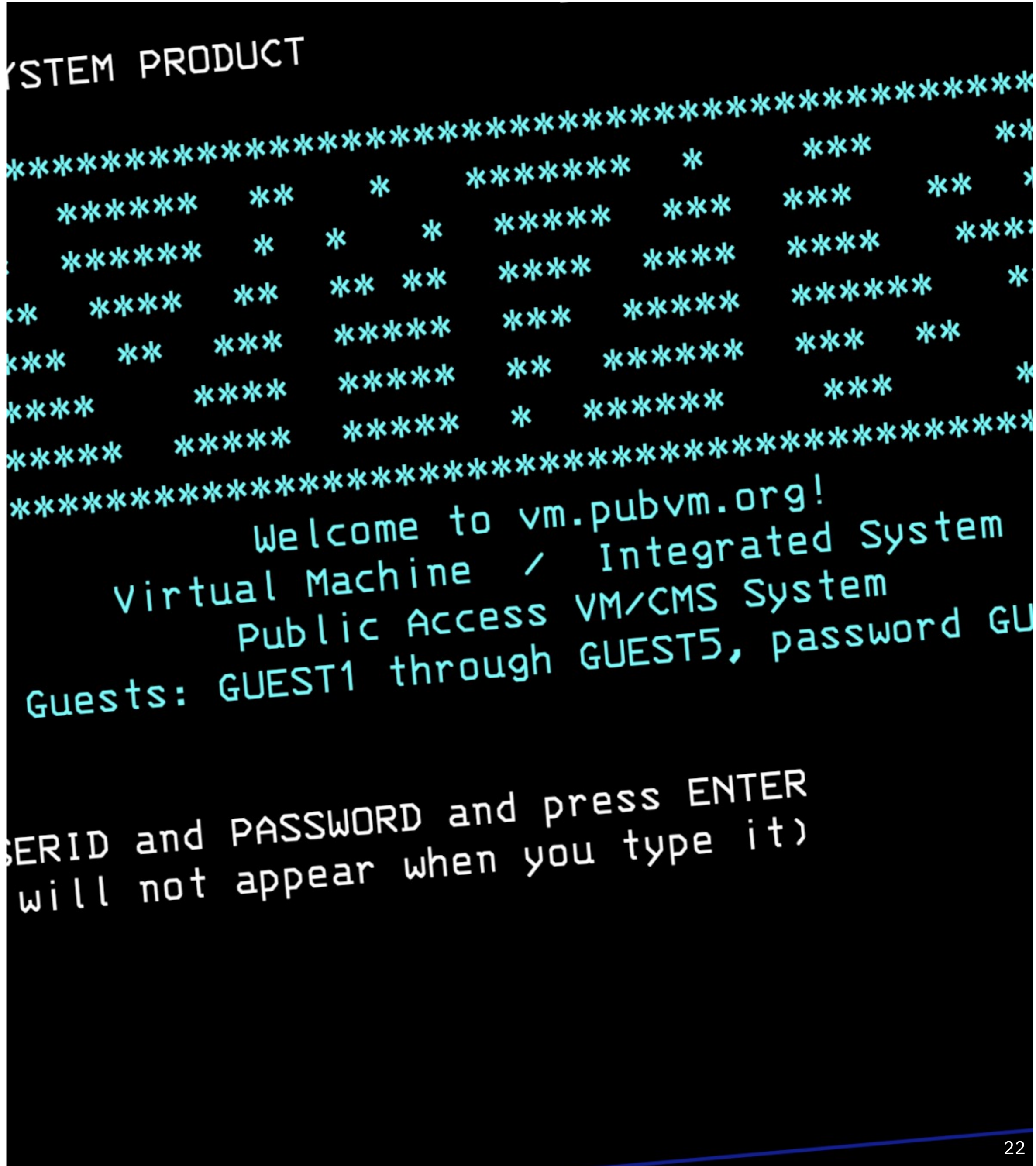
```

WWCHAT: GENERAL FORUM-----08:21-----Line 1245 of 1607
----- GENERAL FORUM appended at 16:54:20 on 26/05/12 GMT (by WEC at EVIEVM)
Subject: WANTED: Snoopy wall calendar
Ref: Append at 16:50:57 on 26/05/12 GMT (by WEC at EVIEVM)

No dice... tried it and it died! I will troubleshoot that later tonight when
I have extra free time (since I don't have any other social obligations to
get to tonight). Maybe it'll also work with the original VS FORTRAN (i.e.
VSFORT) on PUBVM?

Evie

1=Help 2=Header 3=Return 4=Prev App 5=Next App 6=Append
7=Backward 8=Forward 9=To Ref 10=From Ref 11=Last App 12=Resume
13=Save App 14=Summary 15=QuitAll 16=WhosWho 17=Reply 18=Execute
19=Mark 20=To Mark 21=Refs 22=RefTree 23=Print 24=LastQuit
====> _
M&A a 24/007
  
```



Goal: user engagement



Fun

Goal: Historical accuracy with
the release date time frame

1980s

Part four

PUBNET mail bridge

Rudi Rudolph wrote a bridge application to allow VM/SP 5's SMTP facility to work with modern SMTP

```
DFITZGER NOTE      A0  V 132  Trunc=132 Size=23 Line=15 Col=1 Alt=23
Date: 10 June 2026, 20:52:57 GMT
From: Danielle FitzGerald      (845) 555-1212      DFITZGER at PUBVM
To:  smtp at pubnet
Subject: Problems with TOOLSRUN
To:  bjhayden@gmail.com

Bruce,

I'm noticing a problem with TOOLSRUN sending error messages to me
for all of the files on the PUBDOCS disk.  Can you take a look for me?

Regards,

Dan FitzGerald
She/Her or They/Them

1= Help      2= Add line  3= Quit      4= Tab      5= Send      6= ?
7= Backward  8= Forward   9= =        10= Rgtright 11= Spltjoin 12= Power Input

====> █

X E D I T  1 File
```

CMS Discord client

Using the APPWIN windowing library for CMS, Rudi also wrote a native CMS client for the Discord instant messaging platform

```
DISCORD CHANNELS ( 19 )
Updated: 02/19 17:39
Channel: _____
----- PF7/8 to scroll up/down, PF3 to QUIT -----
general:
  General talk and chat, off topic random stuff is welcome. Language may not be
  at least try not to be totally offensive.
projectprinter:

pubvm:
  https://vm.pubvm.org/
evievm:
  http://evievm.pubvm.org
hfvms:
  https://mvs.hugfreevikings.wtf
operator-console:

zospi:
  https://zospi.nmare.net/zosmf/
rexx-ispf-db2-development:

rscsmail:
  https://github.com/Rudi9719/RSCSMail/
games:
MA b
```

Other system highlights

Name	Type	What is it?
ADVENTUR	Game	Colossal Cave Adventure
BASIC360	Development	CALL/360 BASIC interpreter
FORALIST	Application	Bulletin board system
GOPHER	Application	Gopher client
INV2	Game	Space Invaders (M. Cowlshaw port)
OREGON	Game	Oregon Trail
PROFS	Application	IBM Professional Office System
SNPCAL	Application	Generates a Peanuts calendar
STARTREK / STARTRK2	Game	Classic “Star Trek” game
TOOLCAT	System Utility	List packages on a TOOLSRUN disk
TOOLSRUN	System Utility	Federated, distributed filesharing
WORDLE	Game	Wordle
ZORK	Game	Zork I/II/III adventure game

How can I get
access to
PUBVVM?

Accessing PUBVM

PUBVM is available via one of two methods

PUBVM hosts its own website, at <https://vm.pubvm.org>

Web terminal:

- <https://vm.pubvm.org/term.html>
- Yes, even *this* is hosted on VM/SP!

Unsecured tn3270:

- `vm.pubvm.org:24`

Requesting a new account



Method 1: Using PUBVM

Log into a PUBVM guest account

Username: **GUEST1 – GUEST5**

Password: **GUEST**

Then send a note to the systems programming team using the CMS NOTE command:

NOTE NEWUSER



Method 2: Using email

Compose a plain text email to:
newuser@pubvm.org



Include in your request

- Desired username
- Desired 8-character password
- Your email address (so that we can contact you)
- Whether you want to be enrolled in PROFS

Biographies

Evie Cooper

Evie is a PhD student at Auburn University, studying electrical engineering with a focus on systems security. She is an author, a visual artist, a musician, a systems programmer, a teacher, and a researcher.

She runs a System/390 G5 (Multiprise 3000) in her bedroom, complete with multiple DASD arrays, multiple tape drives, multiple network processors, as well as a 3174 establishment controller with multiple real terminals and printers attached.

Evie owns 11 mainframes and 18 support peripherals, including six System/390s, four System Zs, five Sharks, six 3174s, and two 3745s.

Danielle FitzGerald

Danielle has been working with VM for most of her adult life, beginning with a 2006 internship in the VM Development Organization, where she worked on the Live Guest Relocation prototype. Over the course of her 20 year career, she has worked on z/VM CP, the IBM Z HMC, IBM Wave for z/VM, IBM High Performance Computing (Summit and Sierra), z/OS new function prototyping, and has been a z/VM systems programmer for the IBM CIO. She is currently a senior Z developer for Hashicorp.

At home, Danielle runs an IBM PC Server 330 Personal System/390 ("P/390"). She is the co-founder of the Classical Computing Laboratory at IBM Poughkeepsie, a historical IT center on IBM's Poughkeepsie, NY campus. She is also the co-founder of the Danbury-Area Retrocomputing Enthusiasts (D.A.R.E.), a vintage computer restoration group based at the Danbury (Conn.) Makerspace.

Bruce Hayden

Bruce Hayden is a retired z/VM and Linux on Z Subject Matter Expert. Bruce worked across many different areas in IBM where he grew his expertise, including hardware development and testing, the senior architecture team in IBM Global Technology Services, and over a decade with the IBM Worldwide Systems Center. He has nearly 45 years of experience as a VM systems programmer including over 20 years working with Linux on Z. He holds a degree in Computer Science from the University of Missouri-Rolla. His areas of expertise include z/VM, Rexx, CMS Pipelines, and Linux. Bruce is one of the major contributors to the z/VM Express System Install project, where he created almost all of the z/VM installation screens and z/VM installation automation.

Ray Mansell

Ray had a long and storied career working with and on VM in many forms. In his early days at IBM Hursley (UK), he was involved in the development of REXX. Later, he worked on minidisk directory hashing (with Jerry Bozman) in VM/SP 4, and the faster ACCESS and FST sort in VM/SP 5. Other projects that Ray was involved in included work on the VM TCP/IP stack, the IBM Live Guest Relocation prototype, and many, many other things. He has co authored several papers: *Multimedia file serving with the OS/390 LAN Server* (1997), *Practical software reuse for IBM System z I/O subsystems* (2007), and *IBM z13 firmware innovations for simultaneous multithreading and I/O virtualization* (2015)

Ray is famous for his dry sense of humor.

Paul Novak

Paul Novak is a Senior Certified IT Specialist working for the IBM Worldwide Systems Center z/VM and Linux Solutions team in Endicott, New York (formerly known as Linux ATS). Paul has experience in field services, end-user support, software development, enterprise hosting, and enterprise architecture. His areas of expertise are z/VM, Linux, web middleware, containers, automation, and web identity and access management (IAM) solutions. Paul holds several degrees, and is a 4th generation IBM employee with more than 25 years of Linux and Open Source technology experience.

Paul enjoys naps and very large cats.

Rudi Rudolph

Rudi is a systems programmer at the New York State Office of IT Services, and has professional interests in IBM Z processing efficiency and systems architecture. Part of his job allows him to advocate for New York Open Data (<https://data.ny.gov>). Previously he did systems engineering as a civilian contractor for the United States Air Force.

Rudi is interested in writing COBOL and DB2 programs, as well as “bridges” to bring various applications and protocols to IBM Z. Some of his bridges include an SMTP bridge for RSCS, and a Discord client for CMS.

Thank you

PUBVM is not an IBM project and receives no support from IBM Corporation

While IBMers volunteer on PUBVM and PUBNET, they do so on their own time and not during work hours

PUBVM service is provided on an as-is basis, using unsupported software. The PUBVM systems programming team provides no guarantees to Quality of Service, system stability, or data confidentiality. Please consider all use of the PUBVM system as subject to possible security exposure and data loss. Use at your own risk.

Use of the PUBVM system for commercial purposes or any revenue-generating activity is a violation of licensing terms and is strictly forbidden.

© Copyright IBM Corporation 2026

IBM and the IBM logo are trademarks of IBM Corporation, in the United States and/or other countries. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on ibm.com/trademark.

This document is current as of the initial date of publication and may be changed by IBM at any time.

Not all offerings are available in every country in which IBM operates.

THE INFORMATION IN THIS DOCUMENT IS PROVIDED "AS IS" WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING WITHOUT ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OR CONDITION OF NON-INFRINGEMENT. IBM products are warranted according to the terms and conditions of the agreements under which they are provided.

Examples presented are illustrative only. Actual results will vary based on client configurations and conditions and, therefore, generally expected results cannot be provided.

Statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

